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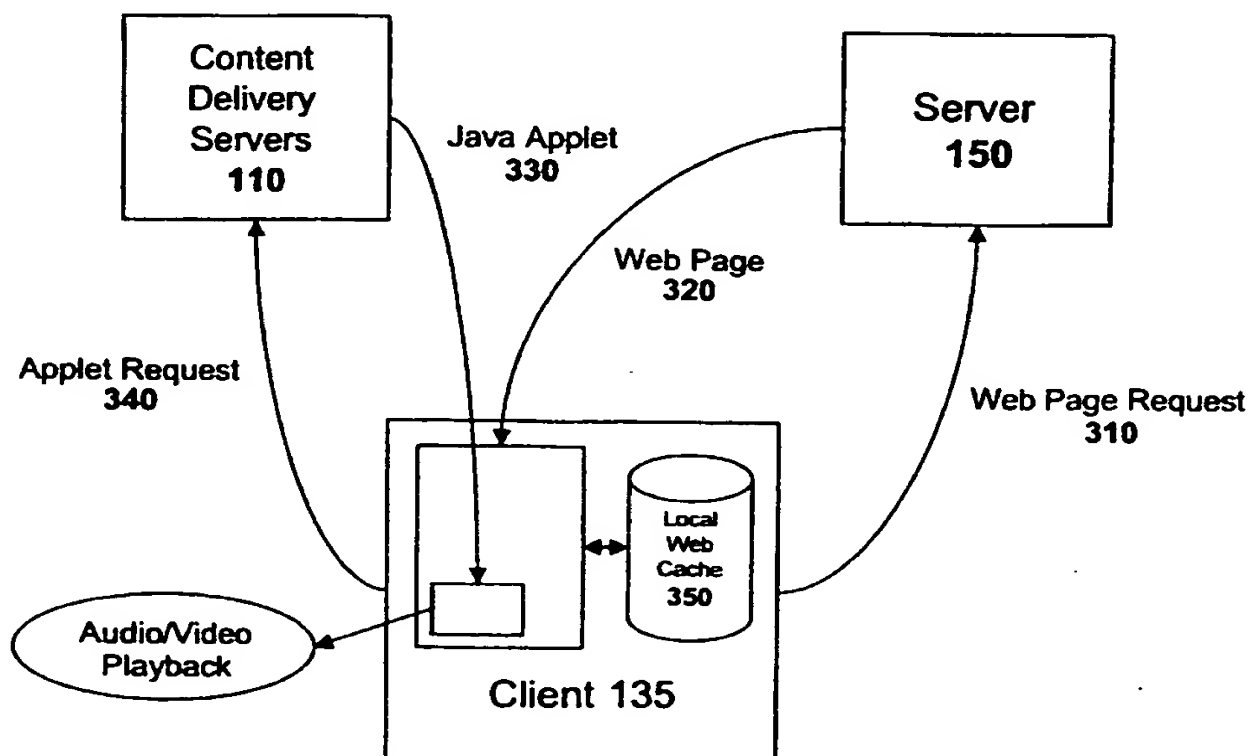
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(54) Title: A SYSTEM AND METHOD FOR PROVIDING AUDIO/VIDEO CONTENT DELIVERY OVER A NETWORK



(57) Abstract: A method is disclosed for delivering audio/video content over a network comprising: providing hosting services including storing audio/video content (110); and providing audio/video streaming services including transmitting a Java applet (330) to an end user (135) in real-time, the Java applet (330) including an audio/videoplayer module, and streaming the audio/video content to the end user (135) in real time. In addition, the system and method provides audio and video content production services, supports transmission of content to multiple destinations, and gathers statistics for reporting on various consumer behaviors.

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## **A SYSTEM AND METHOD FOR PROVIDING AUDIO/VIDEO CONTENT DELIVERY OVER A NETWORK**

### **BACKGROUND OF THE INVENTION**

#### **Field of the Invention**

This invention relates generally to the field of digital audio and video delivery systems. More particularly, the invention relates to an improved system and method for delivering audio and video content over a network.

#### **Description of the Related Art**

Streaming is a technique for transmitting real time audio and/or video over a network. The purpose of streaming is to provide clients with uninterrupted audio/video content over a connection with limited bandwidth (e.g., a 56K-modem connection). A few seconds of the digital audio/video stream is buffered at the client side before the signal is played back. This buffering technique compensates for momentary delays in packet delivery.

Traditionally, in order to provide clients with a service for streaming audio and/or video data (i.e., audio/video "content"), the end users receiving the audio/video content must have a Web browser (e.g., Netscape Navigator™ or Microsoft Internet Explorer™) with an appropriate browser plug-in installed. A "plug-in" is a supplemental program, generally installed after installation of the Web browser, which provides some additional functionality to the browser. For example, if an audio/video content provider streams audio content to clients using Real Media's™ Real Audio™ streaming format, then before an end user can receive and play back the content, the end user must install a Real Audio Player plug-in designed for his/her Web browser.

There are several problems associated with the foregoing arrangement. First, in order to install a plug-in, a user must first select the one which is compatible with his/her system. A plug-in which runs on one browser will not typically run on a different browser. Even for users who are knowledgeable about computers, this process can be somewhat of an annoyance (especially if the user simply wanted to retrieve some quick information from a Web page). In addition, once the user selects the appropriate browser plug-in, the download process for that

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plug-in may take a significant amount of time, particularly if the user does not have a high-speed connection to the Internet (e.g., 56k-baud or less).

Another problem with current audio and video content providers is that no single provider offers a comprehensive system which focuses on all aspects of content delivery. More specifically, audio and video content delivery services may be broken into the following categories: content generation services; encoding services; hosting/streaming services; codec application services; player technology services; multiple destination/delivery media services; and reporting/extraction services. Each of these services will be described in greater detail below. While particular content providers offer some limited number of these services (e.g., encoding services, hosting services, and codec services), no comprehensive centralized business computing model exists for dealing with all of a client's audio/video content needs.

As will be described in more detail below, one of the reasons that no such comprehensive systems exist is because of the underlying technology used in current systems as well as the underlying business model used by current audio/video content providers.

Accordingly what is needed is an audio and/or video content delivery system which may be implemented on currently existing hardware and software platforms without the need for additional upgrading. What is also needed is a content delivery system which provides clients with a comprehensive content delivery service. What is also needed is an audio/video content delivery service which will provide end users with audio/video content through a variety of different delivery mechanisms and communication channels.

## SUMMARY OF THE INVENTION

A system and method is disclosed for delivering audio/video content over a network comprising: providing hosting services including storing audio/video content; and providing audio/video streaming services including transmitting a Java applet to an end user in real-time, the Java applet including an audio/video player module, and streaming the audio/video content to the end user in real time. In addition, the system and method provides audio and video content

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production services, supports transmission of content to multiple destinations, and gathers statistics for reporting on various consumer behaviors.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

A better understanding of the present invention can be obtained from the following detailed description in conjunction with the following drawings, in which:

**FIG. 1** illustrates an exemplary network architecture used to implement elements of the invention.

**FIG. 2** illustrates an exemplary computer architecture used to implement elements of the invention.

**FIG. 3** illustrates one embodiment of a system for providing audio/video content over a network.

**FIG. 4** illustrates a Java applet used for streaming audio and/or video according to one embodiment of the invention.

**FIG. 5** illustrates an audio/video content hosting network configuration according to one embodiment of the invention.

**FIG. 6** illustrates audio/video content production offered in various embodiments of the invention.

**Fig. 7** illustrates each of the functions enabled by the present invention.

### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

#### **A SYSTEM AND METHOD FOR PROVIDING AUDIO/VIDEO CONTENT DELIVERY OVER A NETWORK**

An improved system and method is described for providing audio and video content

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delivery. In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the invention. It will be apparent, however, to one skilled in the art that the invention may be practiced without some of these specific details. In other instances, well-known structures and devices are shown in block diagram form to avoid obscuring the underlying principles of the invention.

Embodiments of the invention include various steps, which will be described below. The steps may be embodied in machine-executable instructions. The instructions can be used to cause a general-purpose or special-purpose processor which is programmed with the instructions to perform certain steps. Alternatively, these steps may be performed by specific hardware components that contain hardwired logic for performing the steps, or by any combination of programmed computer components and custom hardware components.

Elements of the present invention may be provided as a computer program product which may include a machine-readable medium having stored thereon instructions which may be used to program a computer (or other electronic device) to perform a process. The machine-readable medium may include, but is not limited to, floppy diskettes, optical disks, CD-ROMs, and magneto-optical disks, ROMs, RAMs, EPROMs, EEPROMs, magnet or optical cards, propagation media or other type of media/machine-readable medium suitable for storing electronic instructions. For example, the present invention may be downloaded as a computer program product, wherein the program may be transferred from a remote computer (e.g., a server) to a requesting computer (e.g., a client) by way of data signals embodied in a carrier wave or other propagation medium via a communication link (e.g., a modem or network connection).

#### AN EXEMPLARY NETWORK ARCHITECTURE

Elements of the present invention may be included within a client-server based system 100 such as that illustrated in **Figure 1**. According to the embodiment depicted in **Figure 1**, one or more servers 110, 150 communicate to one or more clients 130-133, 135. The clients 130-133, 135 may transmit and receive data from the servers 110, 150 over a variety of communication media including (but not limited to) a local area network 140 and/or a larger network 125 (e.g., the Internet). Alternative communication channels such as wireless communication via satellite broadcast (not shown) are also contemplated within the scope of the present invention.

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The servers 110, 150 may include one or more databases for storing digital audio and/or video data. The databases may also store specific client data (e.g., information on how frequently a particular client logs in to server 110 and that client's preferences) and/or more general data. The database in one embodiment runs an instance of a Relational Database Management System (RDBMS), such as Microsoft™ SQL-Server, Oracle™ or the like.

A client may interact with and receive feedback from servers 110, 150 using various different communication devices and/or protocols. In one embodiment, the client logs in to servers 110, 150 via client software. The client software may include a browser application which supports Java such as Netscape Navigator™ or Microsoft Internet Explorer™ on the client's personal computer and may communicate to servers 110, 150 via the Hypertext Transfer Protocol (hereinafter "HTTP"). In other embodiments included within the scope of the invention, clients may communicate with servers 110, 150 via cellular phones and pagers (e.g., in which the necessary software is embedded in a microchip), handheld computing devices, and/or touch-tone telephones. In addition, the present invention can be used with any device connectable to the Internet in a direct or wireless connection.

#### AN EXEMPLARY COMPUTER ARCHITECTURE

Having briefly described an exemplary network architecture which employs various elements of the present system and method, a computer system 200 representing exemplary clients 130-135 and/or servers 110, 150, and 151 in which elements of the system and method may be implemented will now be described with reference to **Figure 2**.

One embodiment of a computer system 200 comprises a system bus 220 for communicating information, and a processor 210 coupled to bus 220 for processing information. Computer system 200 further comprises a random access memory (RAM) or other dynamic storage device 225 (referred to herein as main memory), coupled to bus 220 for storing information and instructions to be executed by processor 210. Main memory 225 also may be used for storing temporary variables or other intermediate information during execution of instructions by processor 210. Computer system 200 also may include a read only memory (ROM) and/or other static storage device 226 coupled to bus 220 for storing static information and instructions used by processor 210.

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A data storage device 227 such as a magnetic disk or optical disc and its corresponding drive may also be coupled to computer system 200 for storing information and instructions. Computer system 200 can also be coupled to a second I/O bus 250 via an I/O interface 230. A plurality of I/O devices may be coupled to I/O bus 250, including a display device 243, an input device (e.g., an alphanumeric input device 242 and/or a cursor control device 241).

The communication device 240 may comprise a modem, a network interface card, or other well known interface device, such as those used for coupling to Ethernet, token ring, or other types of networks. In any event, in this manner, the computer system 200 may be coupled to a number of servers via a conventional network infrastructure, such as a company's local area network 140 and/or a larger network 125, for example.

#### ONE EMBODIMENT OF A SYSTEM AND METHOD FOR PROVIDING AUDIO/VIDEO CONTENT DELIVERY OVER A NETWORK

In one embodiment of the system and method, the owner/operator of server 150 is a customer of the owner/operator of content delivery servers 110, and client 135 is an end user (e.g., a user dialing out to the Internet from home or connecting via an office network). In this embodiment, the owner of server 150 may contract with the owner of content delivery servers 110 to provide all of his/her audio and video content delivery needs. For example, server 150 may represent an e-commerce client such as Ticket Master™ Online.

With the foregoing business relationship in mind, **Figure 3** illustrates client 135 communicating over network 125 to content delivery servers 110 and server 150. In one embodiment of the system and method, client 135 initially makes a Web page request 310 from server 150 (e.g., by clicking on a link to that Web page) and, in response, server 150 transmits the requested Web page 320 to client 135. The Web page request 310 may contain more information than a simple Web page address. For example, if client 135 has previously visited server 150, then cookie data identifying client 135 may also be transmitted to server 150. Server 150 may then transmit a Web page 320 to client 135 which contains information uniquely tailored to client 135's preferences. For example, server 150 may be a Ticket Master server from which client 135 has purchased numerous tickets to alternative rock concerts. As such, the Web page 320 transmitted to client 135 may contain specific information relating to upcoming

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alternative rock concerts, shows, or featured artists.

Web page 320 in one embodiment includes embedded Web objects such as audio or video applets or players which are automatically transmitted to the client 135 when the Web page is downloaded. This is illustrated in **Figure 3** as applet request 340 from client 135 to content delivery server 110, and subsequent Java applet 330 download. The Java applet 330 of one embodiment is an applet for playing or for streaming audio and/or video content to client 135. Alternatively, the licensed applet or player can be downloaded from server 150 with web page 320.

This embodiment is illustrated in greater detail in **Figure 4**, in which the Java applet is comprised of an audio/video player module 410, a streamer module 411, a codec module 412 as well as the underlying audio/video content 420 (e.g., the song or movie). Codec module in one embodiment uses an advanced pulse code modulation ("ADPCM") codec for compressing/decompressing audio/video content. Accordingly, when audio/video content is to be delivered to a particular end-user, the codec is transmitted along with the content. In one embodiment, the player 410 is transmitted to client 135 in a first network transaction. Secondly, the codec 412 and streamer 411 are transmitted to the client 135. Finally, the content 420 is transmitted to the client 135 for decompression by codec 412.

This embodiment solves many of the problems associated with prior audio/video content delivery systems. For example, because the player 410 and related modules 411-412 are written in Java, these programs are architecture-neutral. Accordingly, they can be executed on any system which includes a Java virtual machine (virtually all Web browser-equipped machines do). In contrast, browser plug-ins used in prior audio and video streaming systems are platform-dependent (e.g., a plug-in developed for Internet Explorer will not necessarily run on Netscape Navigator and a plug-in developed for a Macintosh™ computer will not run on a PC).

In addition, because Java was designed to create compact programs, Java applet 330 may be quite small. In one embodiment, Java applet 330 is slightly more than 4k-bytes in size, making it ideal for streaming applications where a short transmission time is necessary. [One embodiment of the player module 410, streamer module 411, and codec module 412 is described in the co-pending U.S. Patent Application entitled "A System and Method for Streaming Data in



Java,” which is incorporated herein by reference and which is assigned to the assignee of the present application.]

Another benefit of the claimed system and method is that, because the underlying player technology is a Java applet, a continuous connection is not required between the content delivery servers 110 and the end-user client 135. The content delivery servers 110 simply transmits the Java applet followed by the associated audio/video content in a single burst, and it is up to the Java streamer module 411, codec module 412 and player module 410 running on the client 135 to stream, decode and play the incoming content, respectively. In contrast, for prior plug-in streaming players such as the “Real Player” a continuous network connection must be maintained between the player and the content delivery server. The server transmits a few thousand bytes of content and then the player must signal when it needs more. This connection-oriented technology has several drawbacks, including the way in which it is affected by network congestion. If network bandwidth suddenly decreases, then the audio/video transmission will become garbled or completely interrupted.

In one embodiment of the system, the owner/operator of content delivery servers 110 provides a customer outsource business model for its customers, offering a variety of different content delivery services. Each of these services will now be described in detail.

#### *Content Production Services*

Content production is the first step in one embodiment of the content delivery business model and system described herein. The customer (e.g., the owner/operator of server 150) may produce his/her own content. Alternatively, the owner/operator of content delivery servers 110 may produce the content or the customer may use a voice-back feature to originate content.

As shown in Fig. 6, in one embodiment, the owner/operator of content delivery servers 110 licenses a variety of libraries 650 of pre-recorded (i.e., “stock”) content to be offered to its customers. Accordingly, smaller customers who may not be able to afford the studio time required to record a personalized piece of music or audio content, will be able to select from thousands of pre-recorded, pre-licensed works. Pre-licensing in this manner also helps clients who may not understand complex music or audio content rights (e.g., copyright) issues.

Alternatively, the owner/operator of content delivery servers 110 will produce a custom audio/video work 660 for the customer, either alone or by outsourcing the work to a professional recording and/or voice-over agency.

In a third content production service, content delivery server 110 provides a voice-back service 670 in which customers may establish a live network connection with the content delivery server 110 and transmit live video or audio content directly to content delivery server 110.

As shown in Fig. 6, voice-back service 670 allows end-users and/or customers to place audio content on a network using a network connection and a standard telephone line. A user/customer will initially select a "voice-back" option from a Web page on one of the content delivery servers 110 and will then be provided with a unique identification code. The user will call a phone and will be asked to type in the identification code through his phone keypad. The user will then be prompted to enter an audio message. This may be accomplished, for example, using a CTI VOX system. When he is completed with his message, the message may be automatically embedded in a specified portion of the user/customer's web page. Alternatively, the customer may request that the message be e-mailed to selected end users. Accordingly, the voice back feature gives customers and users the ability to place instant audio content on a network.

Regardless of how the underlying audio/video work is produced, the next step in the process is to encode the work so that it may be stored on content delivery servers 110.

### ***Content Encoding***

The step of encoding comprises converting the audio/video content to a particular digital format which may then be stored as a file or database object on content delivery servers 110. Various encoding algorithms may be used to encode content at this step. In one particular embodiment the JASD encoding format is used.

### ***Hosting/Streaming Content***

Encoded content is then stored on one or more of content delivery servers 110 to be used in various ways (described in more detail below) by customers. A more detailed layout of one

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embodiment of content delivery servers 110 is illustrated in **Figure 5**. As illustrated, audio/video content may be stored redundantly across multiple servers 520-524. A back door publication channel 540 may be used for publication. This is done in part so that the bandwidth across network 125 is not diminished. A load balancer 510 receives requests for audio/video content from end users (e.g., client 135) and customers (e.g., server 150) and transmits the requested content from one of the plurality of redundant servers 520-524 depending on how busy each of the servers are.

In one embodiment of the system and method, a second group of content delivery servers 525-529 is employed. This second group of servers 525-529 may be set up in a different area of the world from the first group 520-524. For example, the first group of servers 520-524 may be set up in California while the second group 525-529 may be set up in Japan.

In this embodiment when new audio/video content is published through content publishing channel 540 it may also be sent across network 125 via a virtual private network 530 to a second content publishing channel 541 which stores the content on each of the second group of redundant servers 525-529. In this manner, audio/video content may published at a single location and then geographically dispersed.

Customers who sell products or services in different geographical locations may take advantage of the foregoing network configuration. For example, Chrysler™ motor company might publish audio/video content for both American and a Japanese end users. This content would then be published out across both sets of geographically dispersed servers 520-524 and 525-529. The Japanese audio/video content would be transmitted to those end users located in Japan from the second set of servers 525-529 and the English audio/video content would be transmitted to those end users located in America from the first set of servers 520-524.

### ***Codec, Streaming and Player Technology***

Various aspects of the Java applet player and related codec and steaming modules used in one embodiment of the system and method have been described above in detail.

### ***Multiple Content Destinations Services***

Many of the services offered by the owner/operator of content delivery servers 110 were

described above. These and some additional services are set forth in **Figure 6**.

Using the architecture and methods of the present invention, banner ad services 610 may be offered to customers. Returning to the previous example, if Ticket Master were a customer, and some end user executed a search on Yahoo for "concert tickets," one of the content delivery servers 110 would transmit a produced audio and/or video banner advertisement to be embedded in the Yahoo Web page search results.

Web site services 620 are directed at providing customers with all of the audio and/or video needs for their Web site. For example, if Ticket Master owned an online Web site, then content delivery servers 110 would provide audio/video streaming services for that Web site. These services might include, for example, a message from a particular musician following the purchase of a ticket to that musician's concert by an end user, or the purchase of that musician's compact disk. In another example, web site services 620 may provide a music previewing service. A music previewing service is directed specifically at allowing users to listen to high quality music clips online. These services are primarily for users who are interested in purchasing actual digital music works online rather than user who are interested only in music-related goods/services in the previous example.

E-mail services 640 will allow audio/video content to be embedded in e-mail messages and transmitted to end-users. One embodiment would embed the Universal Resource Locator ("URL") to one of the content delivery servers 110 into the body of the e-mail message, rather than actually embedding the content in the message. In any case, this service could be used as a follow-up to end users. For example, once the user attended a concert, he might receive an audio e-mail which includes audio tracks from an unreleased album, or future concert dates. Because the underlying player technology in one embodiment of the system is Java-based (as described above) there will be no need to know exactly what the end-user's configuration is (e.g., what kind of plug-ins the user has installed, what kind of browser . . . etc). In another example of e-mail services 640, an e-card service may be supported.

E-card services would be used to e-mail an electronic card to an end user. As in the previous example, this might be done following a purchase by the end user. In operation, the user would click on an e-card link and receive audio/video content as well as additional

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information about the goods and/or services he purchased.

Non-PC device service 630 may be used to download audio/video content into various types of non-PC devices such as but not limited to phones, pagers, and hand-held devices. These devices may be audio or video enabled using the present invention.

### ***Reporting/Extraction/Statistics***

In one embodiment of the system and method, content delivery servers 110 will maintain statistics on end-users who received audio/video content. This information may then be transmitted to customers (e.g., to customer server 150).

The types of information to be recorded may be determined by the needs of each customer. This may include, for example, the number of times an end user accessed particular audio/video content, the length of time that the user accessed the content, the number of times the content was repeated . . . etc.

To preserve the confidentiality of its end users, the customer may simply pass a user identification code to one or more of the content delivery servers 110. The content delivery servers will then use this code to keep track of individual user statistics as set forth above (i.e., without actually knowing who the users are).

**Fig. 7** illustrates a set of business/technology functions enabled by the present invention. This set of functions supports the full realm of audio/video creation, delivery, and consumption via the Internet. Each of the functions 710-760 was described in the sections above.

Throughout the foregoing description, for the purposes of explanation, numerous specific details were set forth in order to provide a thorough understanding of the invention. It will be apparent, however, to one skilled in the art that the invention may be practiced without some of these specific details. For example, **Figure 3** illustrates two servers and a single client for implementing specific aspects of the invention. However, one of ordinary skill in the art will recognize that any number of servers (i.e., one or more) and/or clients may implement aspects of the invention. The systems herein are merely a few exemplary embodiments. In addition, while the foregoing description focused on the Java programming language being used for the

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underlying audio/video player, other platform-independent programming languages may be used without departing from the underlying principles of the invention. Accordingly, the scope and spirit of the invention should be judged in terms of the claims which follow.

**CLAIMS**

What is claimed is:

1. A method for delivering audio/video content over a network comprising:  
providing hosting services for customers including storing audio/video content; and  
providing audio/video streaming services for customers, said streaming services  
comprising  
transmitting a Java applet to an end user in real-time, said Java applet including an  
audio/video player module, and  
streaming said audio/video content to said end user in real time.
2. The method for delivering audio/video content over a network as claimed in claim 1 wherein said Java applet further comprises a streaming module and a codec module.
3. The method for delivering audio/video content over a network as claimed in claim 2 wherein said codec module is an ADPCM codec module.
4. The method for delivering audio/video content over a network as claimed in claim 1 wherein said Java applet is used to provide an advertisement banner to said end user.
5. The method for delivering audio/video content over a network as claimed in claim 1 wherein said Java applet is enabled in an e-mail message of an end-user.
6. The method for delivering audio/video content over a network as claimed in claim 1 wherein said Java applet is used to audio/video enable a Web page.
7. The method for delivering audio/video content over a network as claimed in claim 1 wherein said Java applet is used to audio/video enable a non-PC device.

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8. The method for delivering audio/video content over a network as claimed in claim 1 including the additional step of providing audio/video content production services for said customers.

9. The method for delivering audio/video content over a network as claimed in claim 8 wherein said content production services includes pre-licensing a plurality of content libraries to be offered to customers.

10. The method for delivering audio/video content over a network as claimed in claim 8 wherein said content production services includes recording a custom audio/video content for said customers.

11. The method for delivering audio/video content over a network as claimed in claim 8 wherein said content production services includes a voice-back service.

12. The method for delivering audio/video content over a network as claimed in claim 1 wherein said hosting and streaming services are provided on a plurality of redundant content delivery servers.

13. The method for delivering audio/video content over a network as claimed in claim 12 wherein two groups of content delivery servers are located in different geographical locations and content is added to at least one of said two groups over a virtual private network ("VPN").

14. The method for delivering audio/video content over a network as claimed in claim 1 including the step of recording statistics on end users to whom the audio/video content was transmitted.

15. The method for delivering audio/video content over a network as claimed in claim 14 wherein the step of recording statistics on end users is accomplished using an end-user identification number provided by one of said customers.



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16. A business method for providing audio and video services over a network comprising:

recording and encoding audio/video content for a customer;  
hosting said content on one or more servers;  
transmitting said content to one or more end users; and  
recording statistics on said end users.

17. The business method for providing audio and video services over a network as claimed in claim 16 wherein said step of transmitting is comprised of transmitting a Java applet to said end users in real-time, said Java applet including an audio/video player module, and streaming said audio/video content to said end users in real time.

18. The business method for providing audio and video services over a network as claimed in claim 17 wherein said Java applet further comprises a streaming module and a codec module.

19. The business method for providing audio and video services over a network as claimed in claim 18 wherein said codec module is an ADPCM codec module.

20. The business method for providing audio and video services over a network as claimed in claim 16 wherein said step of recording is accomplished by providing said client with pre-licensed, pre-recorded audio or video content.

21. The business method for providing audio and video services over a network as claimed in claim 16 wherein said step of recording statistics on said end users is accomplished using an end-user identification provided by said customer.

22. A computer data signal embodied in a carrier wave comprising:  
a first source code segment which transmits a Java applet to an end user in real-time, said Java applet including an audio/video player module; and  
a second source code segment which streams said audio/video content to said end user in real time.

23. The computer data signal embodied in a carrier wave as claimed in claim 22 wherein said Java applet further comprises a streaming module and a codec module.

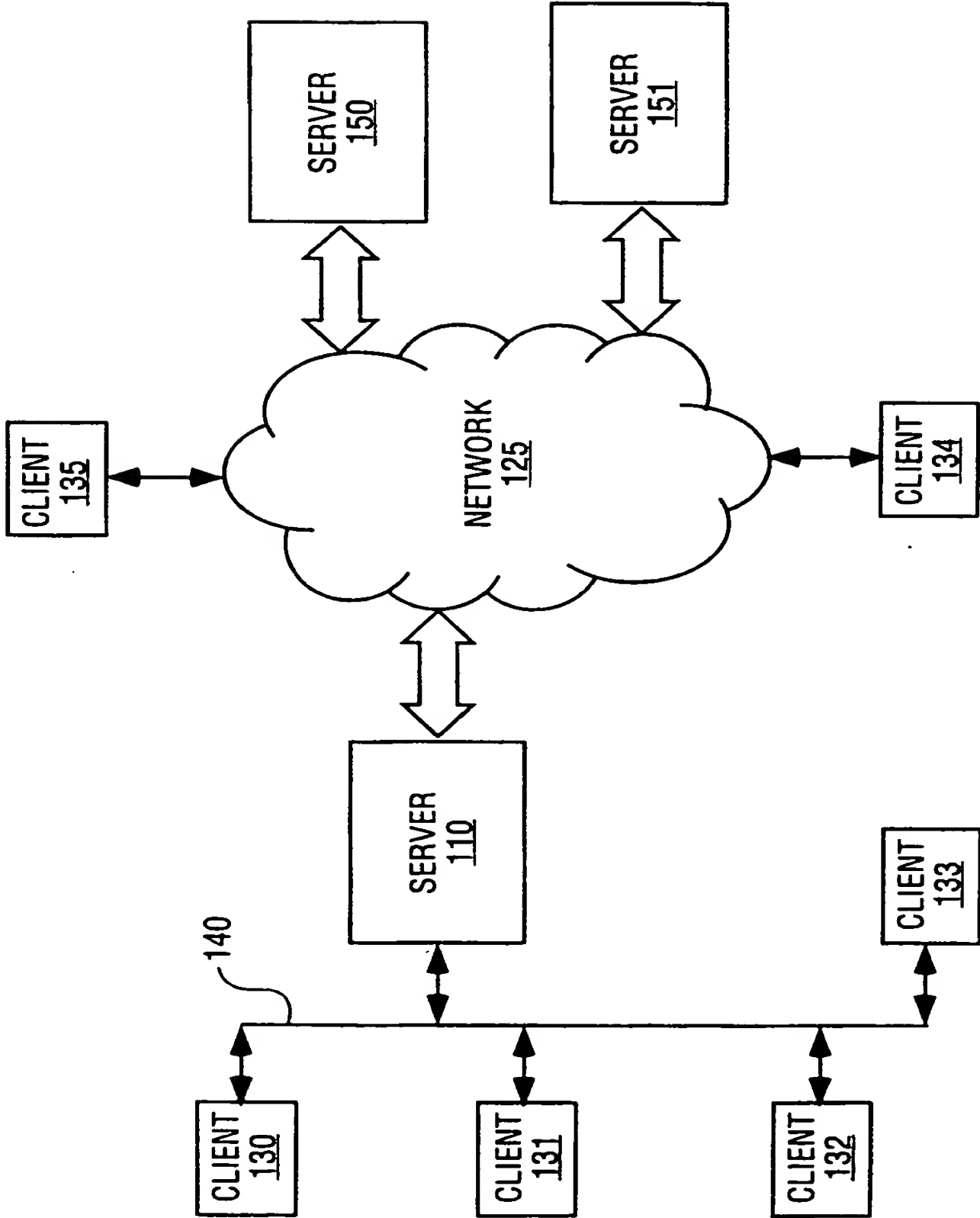


FIG. 1

200

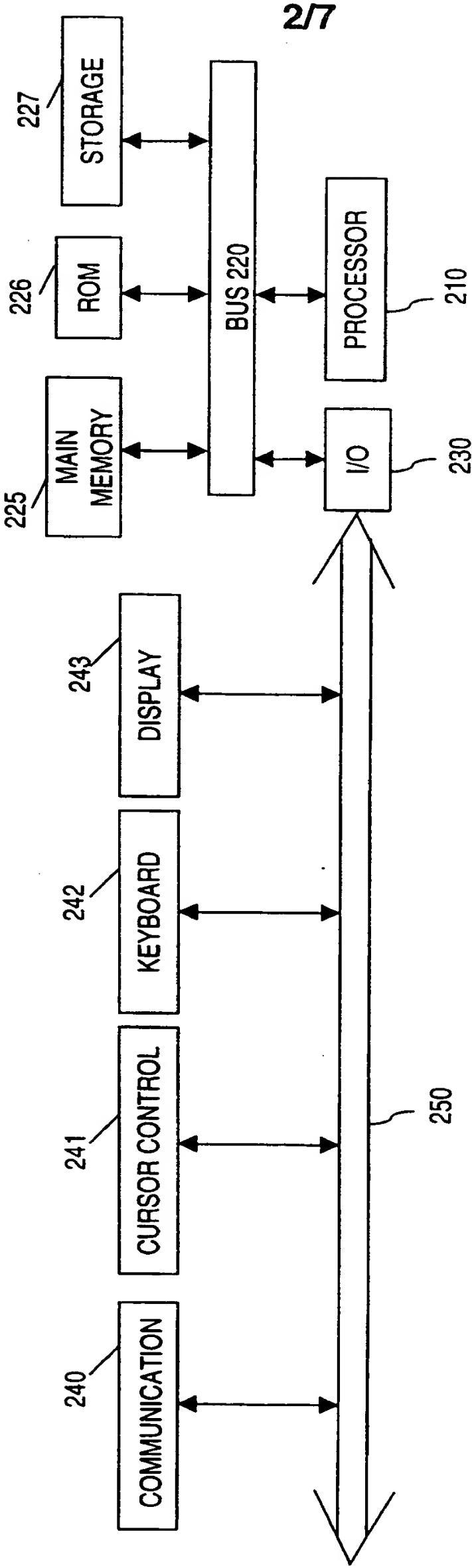


FIG. 2

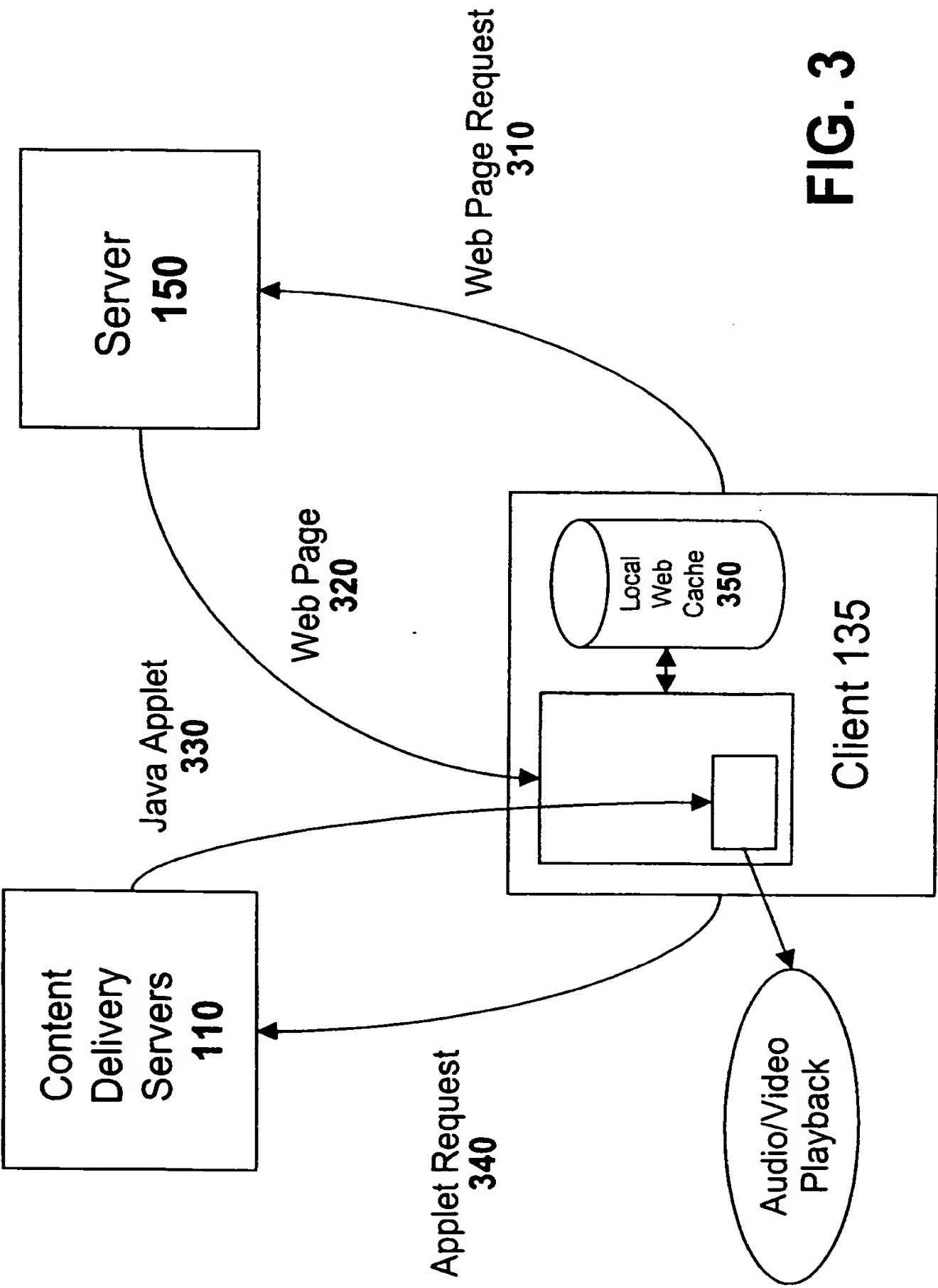


FIG. 3

Java Applet 330

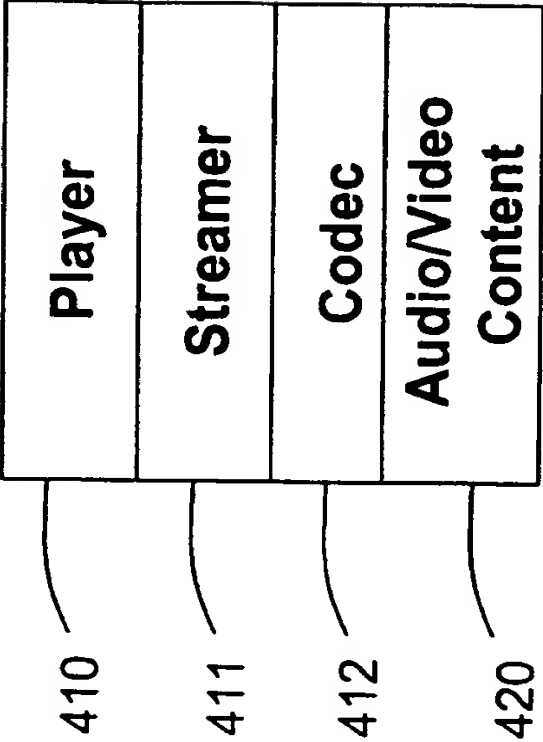


FIG. 4

500

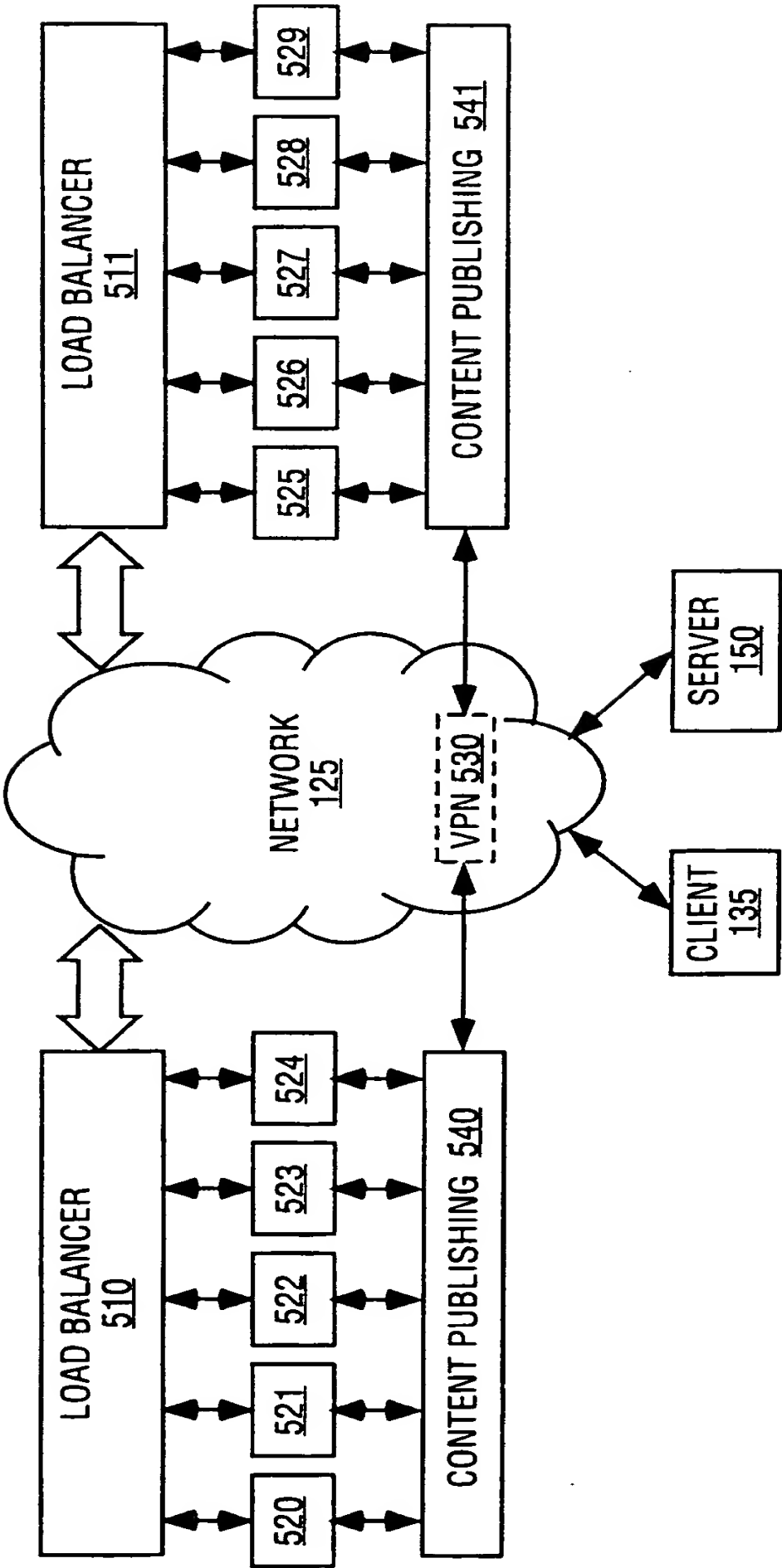
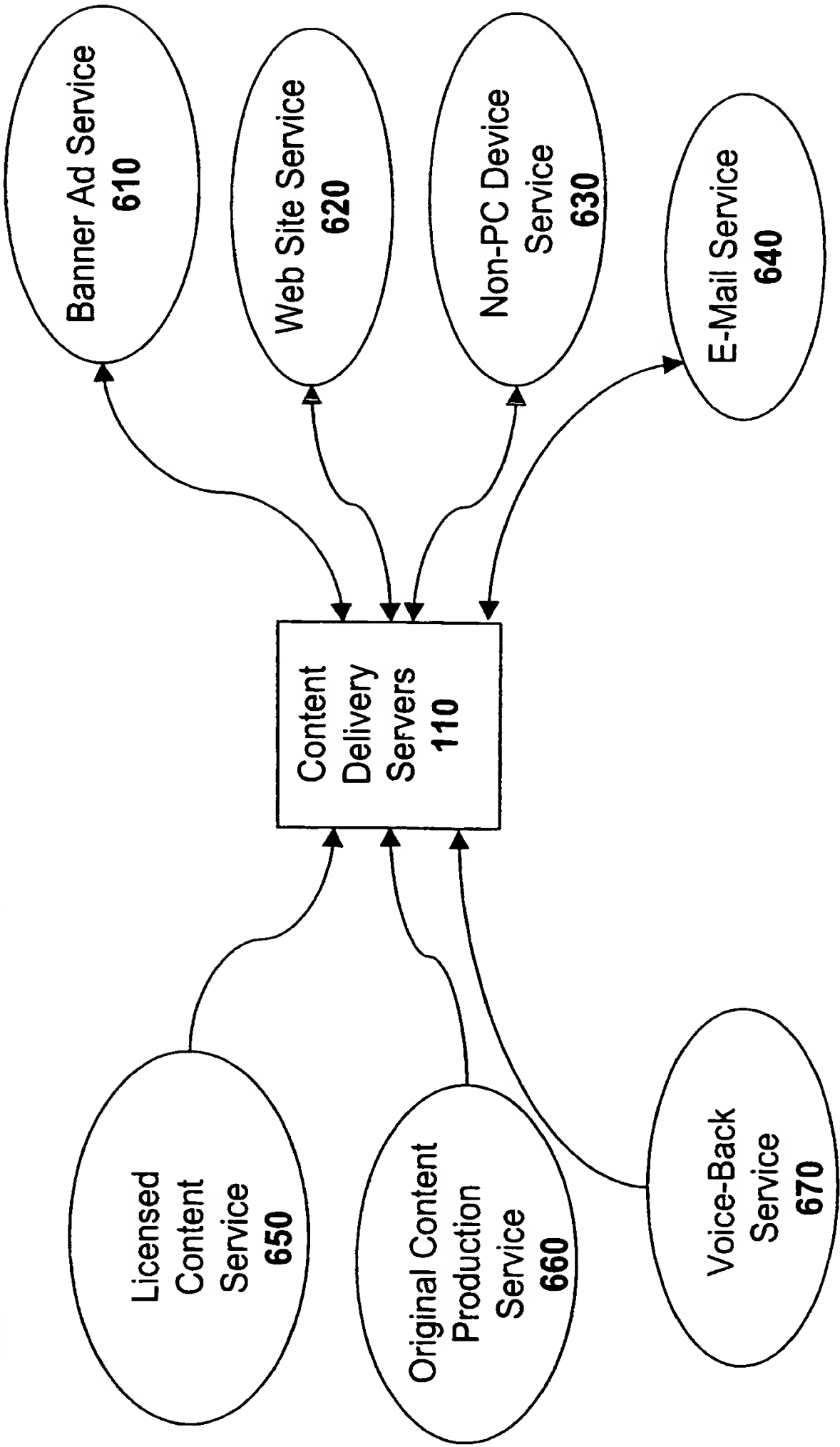


FIG. 5

Multiple Destinations for Content

Content Production Services



**FIG. 6**



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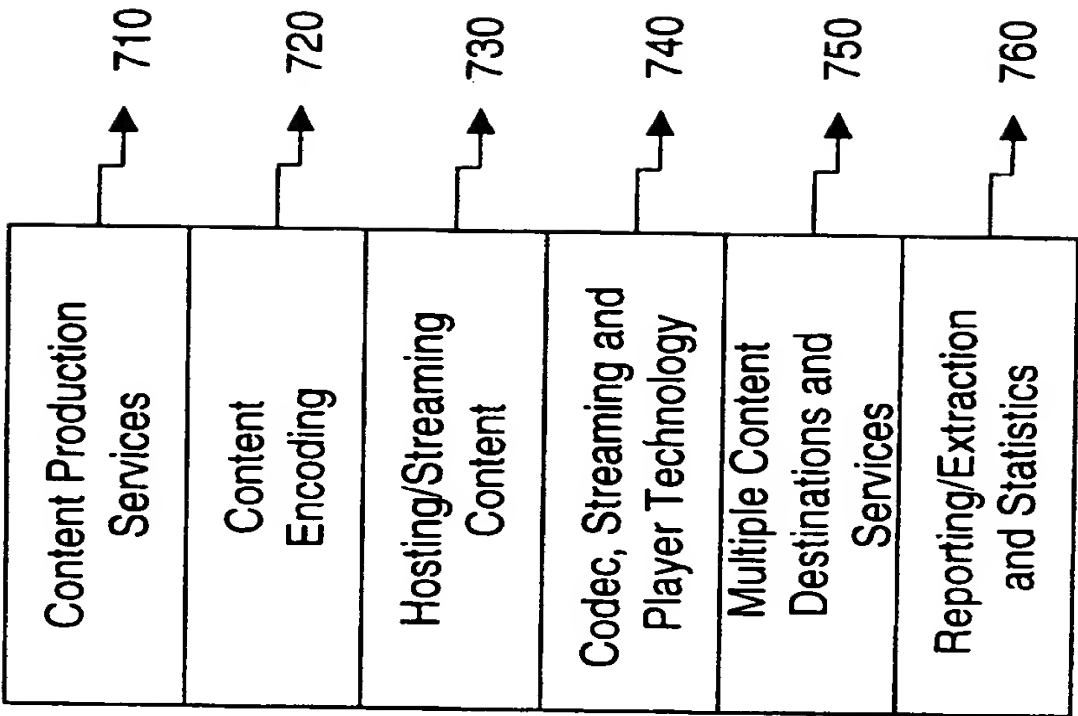


Fig. 7

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/14015

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 15/00

US CL : 709/231

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 709/231, 227, 229, 230

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
west USPAT

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,797,010 A (BROWN) 18 August 1998 (18.08.1998), abstract	1-23
Y	US 5,754,830 A (BUTTS et al) 19 May 1998 (19.05.1998), abstract	1-23



Further documents are listed in the continuation of Box C.



See patent family annex.

<p>* Special categories of cited documents:</p>		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family	

Date of the actual completion of the international search

08 August 2000 (08.08.2000)

Date of mailing of the international search report

25 AUG 2000

Name and mailing address of the ISA/US

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